# Effect of Including MAPS EndCaps

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# Inner Tracker Geometry

- So far, used barrel only configuration of MAPS
- Varying length, 4 layers
- Now including two endcaps, 4 layers each
- Barrel : 4 equal length cylinders, Endcaps : 4 discs each
- Comparing reconstructed $D^0 \rightarrow \pi^+ K^-$ for barrel only and barrel+endcaps configurations
- Compared for ideal case (no vertex smearing, perfect PID). Plots normalized by counts for comparison of relative shape

# MAPS Configurations

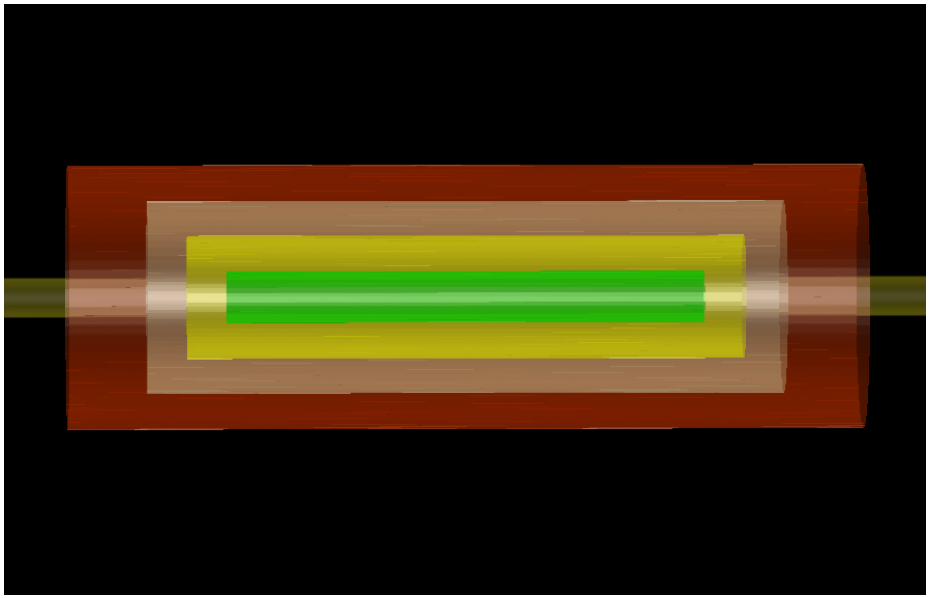

Figure 1: Previous configuration : barrel only

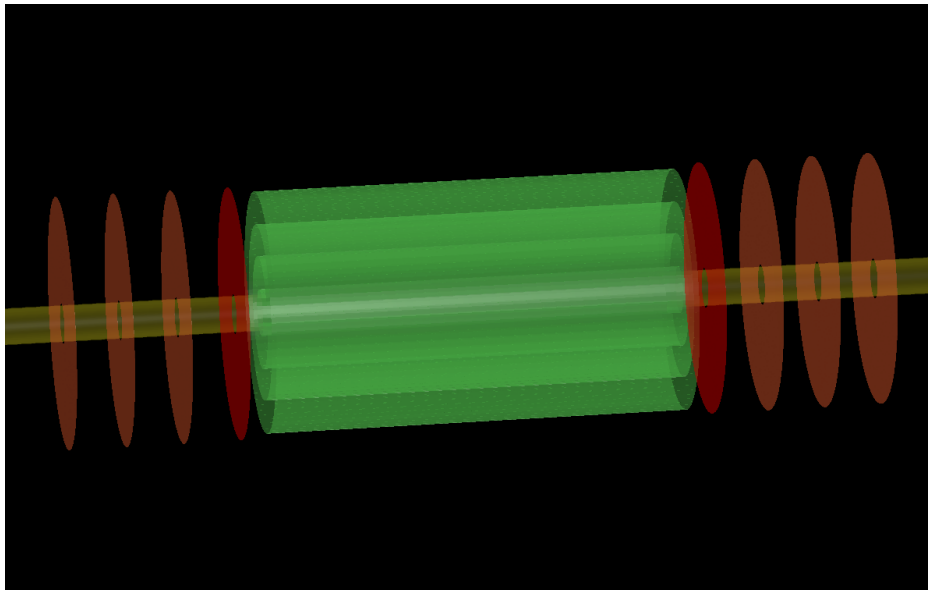

Figure 2: New configuration : barrel + endcaps

# Reconstructed $D^0$

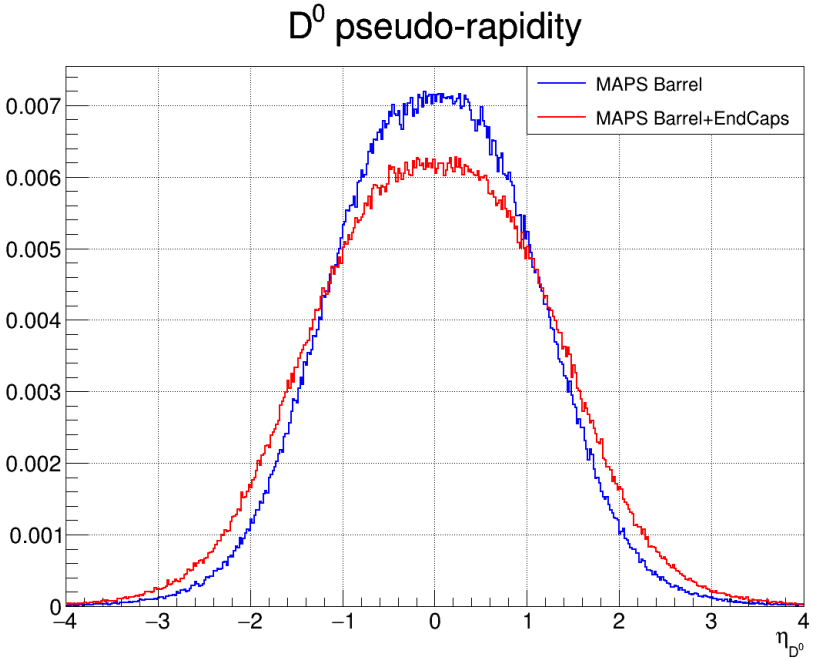


Figure 3: Reconstructed $D^0$ pesudo-rapidity $\eta$

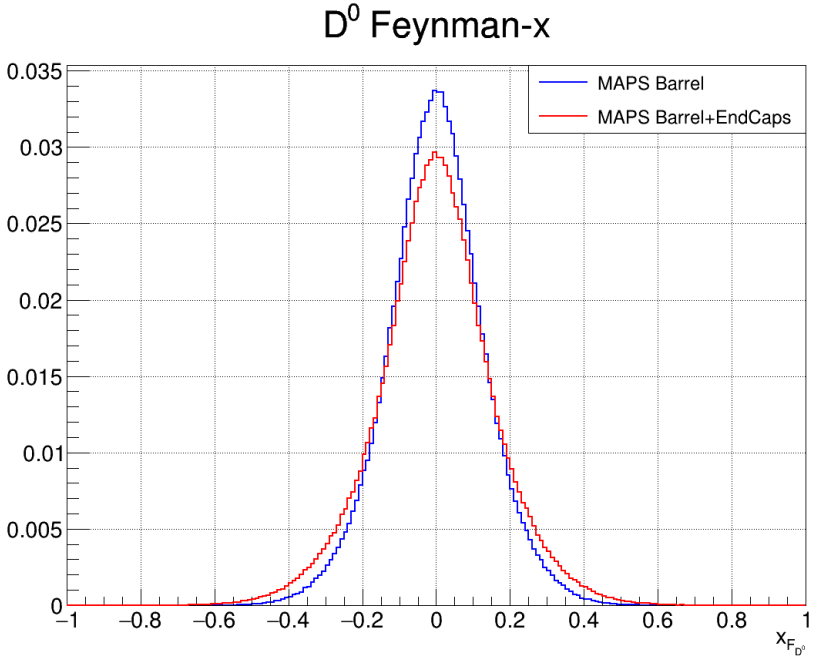


Figure 4: Reconstructed $D^0$ x-Feynman

# Feynman-x Zoomed In : Relevant for $A_N$

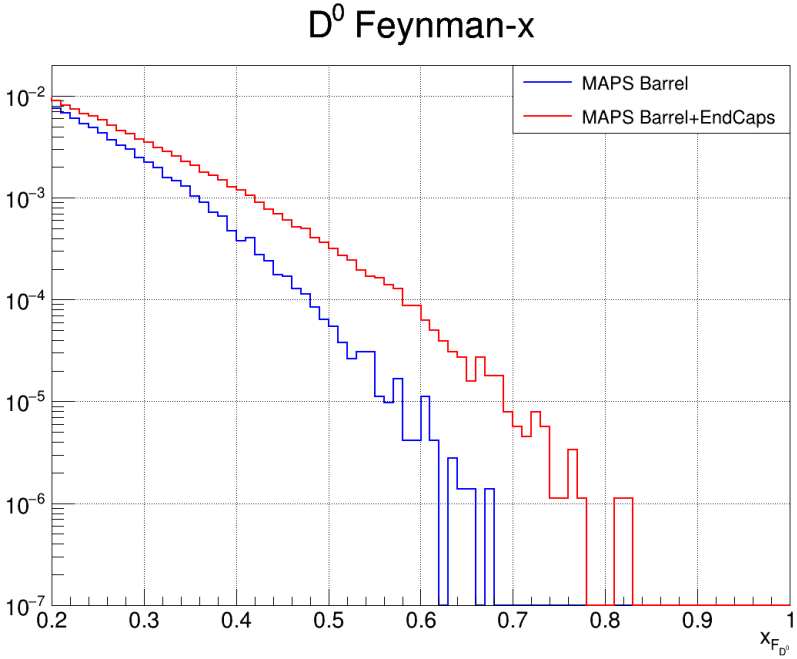


Figure 5: Reconstructed $D^0$ x-Feynman above 0.2

- At $x_F = 0.5$, gain in statistics $\sim 6$ times
- At $x_F = 0.6$, gain in statistics $\sim 10 - 15$ times
- We recover very forward/backward $D^0$s when one or both daughters miss or does not have enough hits in barrel only config

# Summary

- Vertex Detector endcaps are very helpful in gaining statistics in far forward/backward directions
- New configuration is available in maps-endcaps branch in git repository
- More specifically two files need to be swapped and then spdroot reinstalled, if anyone wants to use the new configuration :
  1. /spdroot/reco/vnt/SpdItsMCHitsProducer.cxx
  2. /spdroot/spdgeometry/its/SpdItsGeoMapper.cxx